

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-23. (Cancelled)

Claim 24. (Currently Amended) A system for determining the instantaneous amplitude (a) and phase (ϕ) of an analog sinusoidal signal comprising:

a vibratory accelerometer which produces said analog sinusoidal signal in response to the measurement of a parameter;

an analog-to-digital converter which receives said analog sinusoidal signal from the vibratory accelerometer and converts said analog sinusoidal signal to a digital sinusoidal signal to form the in-phase component (I) of said sinusoidal signal;

a Hilbert transformer approximation device which receives said digital sinusoidal signal and produces the quadrature component (Q) of said digital sinusoidal signal by introducing a phase shift to said digital sinusoidal signal; and

a Coordinate Rotation Digital Computer (CORDIC) comprising:

an amplitude computation device which receives said in-phase (I) and quadrature (Q) components and computes the instantaneous amplitude (a) of said digital sinusoidal signal by processing said in-phase (I) and quadrature (Q) components according to the equation

$$a = \sqrt{Q^2 + I^2}; \text{ [[and]]}$$

a phase computation device which receives said in-phase (I) and quadrature (Q) components and computes the instantaneous phase (ϕ) of said digital sinusoidal signal by processing said in-phase (I) and quadrature (Q) components according to the equation

$$\phi = \tan^{-1}(Q/I); \text{ and}$$

an output which provides the computed instantaneous amplitude (a) and instantaneous phase (ϕ).

Claim 25. (Original) The system of claim 24 wherein said Hilbert transformer approximation device further introduces a predetermined delay into said quadrature component (Q).

Claim 26. (Original) The system of claim 25 further comprising a delay device which introduces said predetermined delay into said in-phase component (I).

Claims 27-35. (Cancelled)

Claim 36. (Currently Amended) A method of determining the amplitude (a) and phase (ϕ) of an analog sinusoidal signal comprising:

- A. measuring a parameter of an object with a vibratory accelerometer;
- B. generating said analog sinusoidal signal representative of said parameter;
- C. digitizing said analog sinusoidal signal to produce a digital sinusoidal signal;
- D. filtering said digital sinusoidal signal to attenuate out-of-band noise in said digital sinusoidal signal;
- E. introducing a delay into said digital sinusoidal signal to produce an in-phase signal (I) associated with said digital sinusoidal signal;
- F. performing a Hilbert transform approximation of said digital sinusoidal signal to introduce a phase shift plus the delay into said digital sinusoidal signal, thereby producing a quadrature signal (Q) associated with said digital sinusoidal signal;

G. processing, with a Coordinate Rotation Digital Computer (CORDIC), said in-phase (I) and quadrature (Q) signals to compute said amplitude (a) of said digital sinusoidal signal according to the equation $a = \sqrt{Q^2 + I^2}$; [[and]]

H. processing, with said CORDIC, said in-phase (I) and quadrature (Q) signals to compute said phase (ϕ) of said digital sinusoidal signal according to the equation $\phi = \tan^{-1}(Q/I)$; and

I. outputting the computed amplitude (a) and phase (ϕ).

Claims 37-40. (Canceled)

Claim 41. (Currently Amended) A system for determining an instantaneous amplitude (a) and phase (ϕ) of an output analog sinusoidal signal comprising:

a vibratory accelerometer which produces said output analog sinusoidal signal characterized by an instantaneous phase and amplitude in response to the measurement of a parameter;

an analog-to-digital converter which receives said output analog sinusoidal signal from the vibratory accelerometer and converts said output analog sinusoidal signal to a digital sinusoidal signal to form the in-phase component (I) of said sinusoidal signal;

a Hilbert transformer approximation device which receives said digital sinusoidal signal and produces the quadrature component (Q) of said digital sinusoidal signal by introducing a phase shift to said digital sinusoidal signal; and

a Coordinate Rotation Digital Computer (CORDIC) comprising:

an amplitude computation device which receives said in-phase (I) and quadrature (Q) components and computes the instantaneous amplitude (a) of said digital sinusoidal signal by processing said in-phase (I) and quadrature (Q) components according to the equation $a = \sqrt{Q^2 + I^2}$; [[and]]

a phase computation device which receives said in-phase (I) and quadrature (Q) components and computes the instantaneous phase (ϕ) of said digital sinusoidal signal by processing said in-phase (I) and quadrature (Q) components according to the equation $\phi = \tan^{-1}(Q/I)$; and

an output which provides the computed instantaneous amplitude (a) and instantaneous phase (ϕ).

Claim 42. (Currently Amended) A method of determining the amplitude (a) and phase (ϕ) of an analog sinusoidal signal comprising:

- A. measuring a parameter of an object with a vibratory accelerometer;
- B. generating an output analog sinusoidal signal characterized by the instantaneous phase and amplitude representative of said parameter;
- C. digitizing said output analog sinusoidal signal to produce a digital sinusoidal signal;
- D. filtering said digital sinusoidal signal to attenuate out-of-band noise in said digital sinusoidal signal;
- E. introducing a delay into said digital sinusoidal signal to produce an in-phase signal (I) associated with said digital sinusoidal signal;
- F. performing a Hilbert transform approximation of said digital sinusoidal signal to introduce a phase shift plus the delay into said digital sinusoidal signal, thereby producing a quadrature signal (Q) associated with said digital sinusoidal signal;
- G. processing, with a Coordinate Rotation Digital Computer (CORDIC), said in-phase (I) and quadrature (Q) signals to compute said amplitude (a) of said digital sinusoidal signal by applying the equation $a = \sqrt{Q^2 + I^2}$; [[and]]
- H. processing said in-phase (I) and quadrature (Q) signals to compute said phase (ϕ) of said digital sinusoidal signal by applying the equation $\phi = \tan^{-1}(Q/I)$; and

I. outputting the computed amplitude (a) and phase (ϕ).